

**What Is Claimed Is:**

1. A protocol processor for processing electronic communications, comprising:

5 a communication interface configured to receive an inbound communication from a communication link and send an outbound communication to the communication link;

a data distribution interface configured to receive outbound data from a communication entity and send inbound data to the communication entity; and

10 a first protocol processing element configured to extract said inbound data from said inbound communication and generate said outbound communication from said outbound data, wherein said protocol processing element comprises:

a register file for storing one of:

15 said inbound communication as said inbound data is extracted; and

said outbound data as said outbound communication is generated;

a parse unit for retrieving data from said inbound communication;

20 a lookup unit for using said retrieved data to identify a first control block indicating how to extract said inbound data; and

a modification unit for performing one or more of said extraction and said generation.

25 2. The protocol processor of claim 1, wherein said register file comprises one or more registers.

3. The protocol processor of claim 2, wherein a first register in said

register file is large enough to store said inbound communication intact.

4. The protocol processor of claim 2, wherein a first register in said register file is large enough to store said outbound data intact.

5

5. The protocol processor of claim 2, wherein a first register in said register file stores a portion of said inbound communication for said extraction and a second register in said register file stores said outbound data for said generation.

10

6. The protocol processor of claim 1, wherein said inbound communication is a packet.

7. The protocol processor of claim 1, further comprising a second protocol processing element.

8. The protocol processor of claim 1, wherein said first protocol processing element further comprises a timer unit for managing a timer associated with a communication stream involving said communication entity.

20

9. The protocol processor of claim 1, further comprising a control block cache for caching said first control block.

10. The protocol processor of claim 1, further comprising a data streaming unit configured to stream said inbound communication into said register file.

25

11. The protocol processor of claim 10, wherein said data streaming unit is further configured to stream said outbound communication out of said register file.

5 12. A protocol processor for processing a packet received from a communication link, comprising:  
a first register configured to store a header of a first packet received from a communication link;  
a parse unit coupled to said first register and configured to parse said  
10 header to extract data from one or more header fields;  
a lookup unit coupled to said first register and configured to use said data to identify a control block associated with the first packet, wherein said control block indicates how the first packet may be processed; and  
a modification unit coupled to said first register and configured to modify  
15 the first packet.

13. The protocol processor of claim 12, further comprising a timer unit coupled to said first register and configured to manage a set of timers associated with a communication stream comprising the first packet.

14. The protocol processor of claim 12, further comprising a control block cache coupled to said first register and configured to store said control block for use when a subsequent packet in the same communication stream as the first packet is received.

15. The protocol processor of claim 12, further comprising a data streaming unit coupled to said first register and configured to load said header into

said first register.

16. The protocol processor of claim 15, wherein said data streaming unit is also configured to load said control block into a control block cache.

5

17. The protocol processor of claim 12, wherein said parse unit is further configured to parse a payload of the first packet.

18. The protocol processor of claim 17, wherein said payload is parsed to extract information for identifying a destination entity to which said payload may be forwarded.

10

19. The protocol processor of claim 12, wherein said modifying said header comprises removing said header.

15

20. The protocol processor of claim 12, wherein said first register is greater than 64 bytes in size.

21. The protocol processor of claim 12, wherein said first register is large enough to store said first packet.

20

22. A protocol processor configured to prepare a set of data for transmission over a communication link, comprising:

a first register configured to store a set of data as one or more protocol headers are constructed for said set of data to facilitate transmission of said set of data over a communication link;

25

a lookup unit coupled to said first register and configured to identify a

control block configured to indicate how to construct said protocol headers;

a modification unit coupled to said first register and configured to assemble said protocol headers in said first register according to said control block; and

5 a timer unit coupled to said first register and configured to manage a set of timers associated with said control block to ensure that said set of data is transmitted within a predetermined period of time.

23. The protocol processor of claim 22, further comprising a control  
10 block cache coupled to said first register and configured to store said control block for use with a second set of data.

24. The protocol processor of claim 22, further comprising a data  
streaming unit coupled to said first register and configured to stream said protocol  
15 headers and said set of data from said first register toward the communication link.

25. The protocol processor of claim 22, further comprising a data  
streaming unit coupled to said first register and configured to load said header into  
20 said first register.

26. The protocol processor of claim 25, wherein said data streaming unit is further configured to load said control block into a control block cache.

25 27. The protocol processor of claim 22, wherein said first register is greater than 64 bytes in size.

28. The protocol processor of claim 22, wherein said first register is large enough to store said first packet.

29. A method of extracting a payload from an electronic communication, comprising:

5 receiving an electronic communication comprising a payload and one or more protocol headers;

storing a first portion of the communication in a register, wherein said first portion comprises said protocol headers;

10 extracting communication details from said first portion of the communication;

retrieving a control block indicating how to process the communication, wherein said control block is identified with said communication details;

forwarding said payload to a destination of the communication; and

15 updating said control block.

30. The method of claim 29, wherein said storing a first portion comprises storing the electronic communication, in its entirety, in said register.

20 31. A method of packetizing a set of data for transmission, comprising:

receiving a set of data from a source communication entity for transmission over a communication link;

storing the set of data in a register;

identifying a control block indicating how to process the set of data,

25 wherein said control block is identified using information provided by the source communication entity;

adding one or more protocol headers to the set of data to form a

communication packet;

streaming said communication packet from said register for transmission  
over the communication link; and

updating said control block.

5

32. The method of claim 31, wherein said storing the set of data  
comprises storing the entire set of data in a single register.

33. The method of claim 31, wherein said register is large enough to  
10 store all of said protocol headers.